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(54) **COMPUTER IMPLEMENTED SYSTEM AND METHOD FOR EVALUATING GAS GENERATOR LAUNCHERS**

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(57) **ABSTRACT**

A computer-implemented system and method for evaluating gas generator launchers is provided. The method includes fixing the system geometry and establishing initial conditions of the launcher to be evaluated. The initial conditions include a mass, composition and geometry of the fuel included in the gas generant, geometries of the system components, initial pressures and temperatures and the mass and geometry of the device to be launched. A gas generator internal ballistics burn rate is modeled and an amount of mass and energy added to the combustion chamber as the fuel is consumed is calculated. Then, using conservation of mass and energy principles, an energy flux rate is modeled, beginning with the fuel and ending with the work performed on the device in order to propel it from the launcher. The modeling method is performed using a computer-based gas generator launcher simulation system, which includes a means for inputting gas generator launcher geometries and initial conditions, a launcher simulator program in computer memory for resolving gas and device dynamic equations to integrate a solution from said initial conditions to the end of a launch cycle, and a display means for displaying the integrated solution.

10 Claims, 6 Drawing Sheets